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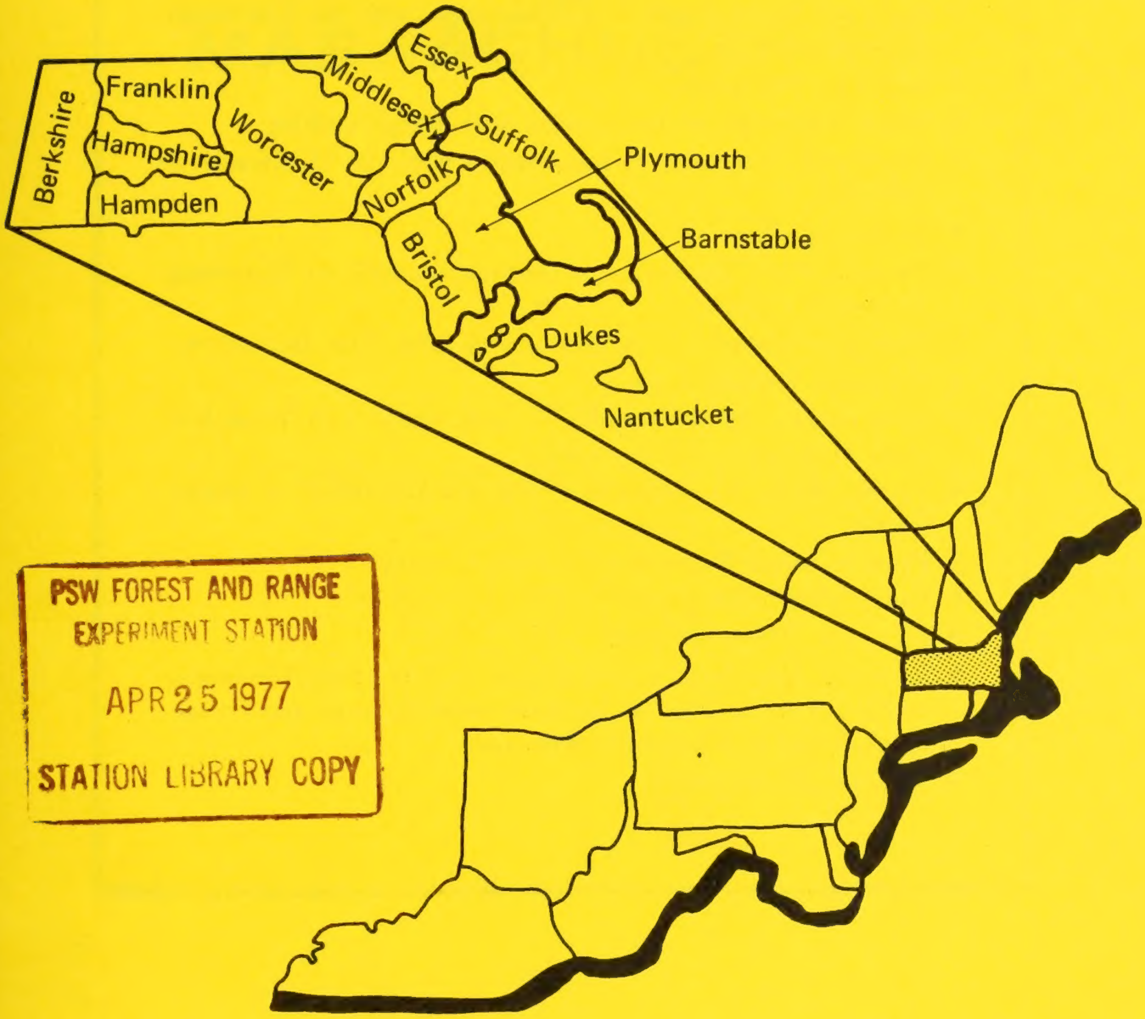
FOREST STATISTICS for MASSACHUSETTS



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FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE
NORTHEASTERN FOREST EXPERIMENT STATION
6816 MARKET STREET, UPPER DARBY, PA. 19082

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FOREST STATISTICS for MASSACHUSETTS

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THE MASSACHUSETTS RESURVEY

THIS REPORT contains data from the second inventory of the forest resources of Massachusetts. The inventory was completed in 1971 by the Northeastern Forest Experiment Station in cooperation with the Massachusetts Department of Natural Resources.

The first inventory of Massachusetts was completed in 1952. Because of many differences in standards and measurement techniques, the results of the current inventory are not directly comparable to the initial inventory. The trends in the resource, after the initial data have been adjusted to the resurvey standards, show these changes:

	1953	*1972*	*Change*
COMMERCIAL FOREST LAND (thousand acres):	3,259.2	2,797.7	−461.5
GROWING STOCK VOLUME (million cubic feet):			
Softwoods	804.1	1,267.3	463.2
Hardwoods	1,311.2	2,215.6	814.4
Total	2,115.3	3,392.9	1,277.6
SAWTIMBER VOLUME (million board feet):			
Softwoods	1,905.0	3,535.2	1,630.2
Hardwoods	1,554.0	3,056.8	1,502.8
Total	3,459.0	6,592.0	3,133.0

The inventory statistics reported here were obtained by a sampling procedure that utilizes recent aerial photography, the partial remeasurement of ground samples from the initial inventory, and the establishment of new ground sample locations. In Massachusetts this required the remeasurement of 250 plots, the interpretation of 11,200 points on aerial photographs into land-use and cubic-foot volume classes, and the location and establishment of 329 on-the-ground measurement locations as a subsample of the photo points. The data thus collected were summarized according to the Sampling with Partial Replacement (SPR) design, using the FINSYS computer system developed by the Northeastern Forest Experiment Station.

The inventory was designed to estimate resource data for the State as a whole. However, estimates for individual counties are also available, based on the photo-plot data for the particular county, expanded by the on-the-ground measurement subsample for a photo unit. Since this procedure is based on the assumption that certain attributes of the ground plots are homogeneous across county boundaries, in Massachusetts every attempt has been made to develop photo units that are homogeneous for the attributes of interest. Nevertheless, the user of county data should recognize the limited and variable accuracy of the estimates for individual counties.

The reader may wish to consult other companion publications regarding this resurvey. THE

FOREST RESOURCES OF SOUTHERN NEW ENGLAND (Resource Bulletin NE–36, 1974, by Neal P. Kingsley) provides an analysis and interpretation of the current forest resource of this region along with an evaluation of the trends since the first inventory. PRIMARY WOOD-PRODUCT INDUSTRIES OF SOUTHERN NEW ENGLAND, 1971 (Resource Bulletin NE–30, 1973, by James T. Bones) is a report on a complete canvass of the primary wood manufacturers and an analysis of the trends in industrial wood output since 1952. THE FOREST-LAND OWNERS OF SOUTHERN NEW ENLAND (Resource Bulletin NE–41, 1976, by Neal P. Kingsley) is a report on a canvass of forest-land owners in the three Southern New England states, including an analysis of their ownership objectives, harvesting practices and socioeconomic characteristics.

THE FOREST RESOURCE

Of the total land area of Massachusetts, 56 percent—2,797,700 acres—is commercial forest land. This is a decrease of 14 percent since the last survey.[1]

The distribution of commercial forest land area by major forest type has changed significantly since the last survey. In softwood types, the area of the white pine-red pine-hemlock type has increased while the area of the pitch pine type has decreased. In hardwood types, the area of the elm-ash-red maple type has increased while the areas of all other hardwood types have decreased.

As part of the survey, a canvass was made of the attitudes and objectives of the owners of privately-owned commercial forest land. A detailed questionnaire was sent to all owners of forest survey plot locations that were classified as privately-owned. Data from the questionnaires reveal that there are more than 100,000 owners of commercial forest land in the State. Eighty-five percent of them are individuals, 8 percent are corporations, and the remaining 7 percent are partnerships, associations, undivided estates, and the like. Individuals hold 76 percent of the privately held commercial forest land, corporations 13 percent, and other owners 11 percent. The average owner of private commercial forest land in Massachusetts holds fewer than 25 acres. The study also shows that fewer than 1 of 7 owners in the State have harvested timber.

Despite the decrease in commercial forest land area, the current net volume of growing stock has increased substantially. Current total net volumes of 3,393 million cubic feet and 6,592 million board feet represent averages of 1,213 cubic feet and 2,356 board feet per acre of commercial forest land. These are increases of 60 percent in cubic-foot volume and 90 percent in board-foot volume between surveys.

The softwood and hardwood proportions of total net growing stock volume are nearly the same as in 1953. Softwoods equal 37 percent of the total cubic-foot volume and 54 percent of the total board-foot volume. White pine accounts for 71 percent of total softwood volume. Hemlock is next with 17 percent. In the hardwoods, the predominant species in cubic-foot volume are red maple (24 percent), northern red oak (19 percent), and other oaks, mostly white, black, and chestnut oak (21 percent). In board-foot volume, northern red oak is first (27 percent), followed by other oaks (25 percent) and red maple (15 percent).

Average annual growth-and-removal data show that, for all species combined, growth has exceeded removals by a ratio of more than 2 to 1 during the period between surveys. The corresponding ratio for softwood sawtimber is more than 3 to 1.

Among counties, the ratio of growing-stock volume per acre of commercial forest land varies only slightly. Berkshire County, with the highest ratio, contains 15 percent of the commercial forest land and 18 percent of the growing-stock volume in the State. At the other end of the scale, Barnstable County contains 2 percent of the commercial forest land and 2 percent of the growing-stock volume.

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[1] Ferguson, R. H., and J. J. McGuire, 1956. The timber resources of Massachusetts. USDA For. Serv. Northeast. For. Exp. Stn. 45 p.

DEFINITION OF TERMS

Land Area Classes

Land area.—(a) Bureau of the Census. The area of dry land and land that is temporarily or partly covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, estuaries, and canals that are less than ⅛ statute mile in width; and lakes, reservoirs, and ponds that are less than 40 acres in area. (b) Forest Survey. The same as the Bureau of the Census, except that the minimum width of streams, etc. is 120 feet and the minimum size of lakes etc. is 1 acre.

Forest land.—Land that is at least 16.7 percent stocked (contains at least 7.5 square feet of basal area) by forest trees of any size, or that formerly had such tree cover and is not currently developed for nonforest use. (Forest trees are woody plants that have a well-developed stem and usually are more than 12 feet in height at maturity.) The minimum area for classification of forest land is 1 acre.

Commercial forest land.—Forest land that is producing or capable of producing crops of industrial wood (more than 20 cubic feet per acre per year) and is not withdrawn from timber utilization. (Industrial wood: all roundwood products, except fuelwood.)

Ownership Classes

Federal.—Lands (other than National Forests) that are administered by Federal agencies.

State.—Lands that are owned by the state or leased to a state for 50 years or more.

County and municipal.—Lands that are owned by counties and local public agencies or municipalities or leased to them for 50 years or more.

Forest industry.—Lands that are owned by companies or individuals operating wood-using plants.

Miscellaneous private.—Privately owned lands other than forest-industry and farmer-owned lands.

Farmer-owned.—Lands that are owned by farm operators, whether part of the farmstead or not. Excludes land leased by farm operators from non-farm owners.

Stand-Size Classes

Stand.—A growth of trees (see definitions under "Tree Classes") on a minimum of 1 acre of forest land that is at least 16.7 percent stocked by forest trees of any size.

Sawtimber stands.—Stands that are at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands that are at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees and in which poletimber stocking exceeds that of sawtimber.

Sapling-seedling stands.—Stands that are at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is sapling and/or seedlings.

Nonstocked areas.—Commercial forest land that is less than 16.7 percent stocked with growing-stock trees.

Tree Classes

Growing-stock trees.—Live trees of commercial species that are classified as sawtimber, poletimber, saplings, and seedlings; that is, all live trees of commercial species except rough and rotten trees.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot sawlog or two nontiguous sawlogs, each 8 feet or longer, now or prospectively, and do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees.—(a) The same as above, except that rough trees do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees that are of noncommercial species.

Forest Types

Forest type.—A classification of forest land based upon the species forming a plurality of basal area of live trees. The many local forest types in the Northeast were combined into the following major forest types:

White pine-red pine-hemlock.—Forests in which eastern white pine, red pine, or hemlock, singly or in combination, make up a plurality of the stocking. (Common associates include aspen, birch, and maple.)

Spruce-fir.—Forests in which spruce or true firs, singly or in combination, comprise a plurality of the stocking. (Common associates include white cedar, tamarack, maple, birch, and hemlock.)

Pitch pine-eastern redcedar.—Forests in which pitch pine or eastern redcedar, singly or in combination, make up a plurality of the stocking. (Common associates include oak and hickory.)

Oak-pine.—Forests in which oaks or hickory, singly or in combination, make up a plurality of the stocking, but in which pitch pine and/or eastern redcedar make up 25 to 50 percent of the stocking.

Oak-hickory.—Forests in which oaks or hickory, singly or in combination, make up a plurality of the stocking, except where pitch pine and/or eastern redcedar make up 25 or 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, and red maple.)

Elm-ash-red-maple.—Forests in which elm, ash, or red maple, singly or in combination, make up a plurality of the stocking. (Common associates include beech and sugar maple.)

Maple-beech-birch.—Forests in which sugar maple, beech, or yellow birch, singly or in combination, make up a plurality of the stocking. (Common associates include sweet birch, black cherry, hemlock, and white pine.)

Class of Timber

Sawtimber trees.—Live trees of commercial species, (a) that are of the following minimum diameters at breast height—softwoods 9.0 inches and hardwoods 11.0 inches, and (b) that contain at least one 12-foot or two noncontiguous 8-foot merchantable sawlogs and that meet regional specifications for freedom from defect.

Poletimber trees.—Live trees of commercial species that meet regional specifications of soundness and form, and are at least 5.0 inches dbh but are smaller than sawtimber size.

Saplings.—Live trees of commercial species that are 1.0 to 5.0 inches dbh and of good form and vigor.

Seedlings.—Live trees of commercial species that are less than 1.0 inch dbh and are expected to survive.

Timber Measurement and Volume

Growing-stock volume.—Net volume, in cubic feet, of live growing-stock trees that are 5.0 inches dbh and larger, from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. Net volume equals gross volume less deduction for rot and/or sweep and crook.

Sawtimber volume.—Net volume in board feet, International ¼-inch rule, of merchantable sawlogs in live sawtimber trees. Net volume equals gross volume less deductions for rot, sweep, and other defects that affect use for lumber.

Annual Net Growth and Timber Removals

Average annual net growth of growing stock.—The change (resulting from natural causes) in volume of sound wood in sawtimber and poletimber trees during the period between surveys, divided by the length of the period. (Components of annual net growth of growing stock include the increment in net volume of trees present at the beginning of the period and surviving to its end, plus net volume of trees reaching poletimber size during the period, minus the net volume of trees that died during the period, minus the net volume of trees that became rough or rotten trees during the period, cull increment.)

Average annual growing-stock removals.—The net cubic-foot volume of growing-stock trees removed by harvesting or killed in logging, cultural operations such as timber-stand improvement, and land-clearing; or changes in land use during the period between surveys, converted to an annual basis.

Average annual net growth of sawtimber—The change (resulting from natural causes) in net board-foot volume of sawtimber during the period between surveys, divided by the length of the period. (Components of annual net growth of sawtimber include the increment in net volume of sawtimber trees present at the beginning of the period and surviving to its end, plus the net volume of trees reaching sawtimber size during the period, minus the net volume of sawtimber trees that died during the period, minus the net volume of sawtimber trees that became rough or rotten trees during the period between surveys, cull increment.)

Average annual sawtimber removals.—The net board-foot volume of sawtimber trees removed by harvesting or killed in logging, cultural operations such as timber-stand improvement, and land-clearing; or changes in land use during the period between surveys, converted to an annual basis.

Annual removals trend-level.—The estimated removals of growing stock or sawtimber for a specific year that are consistent with the trend of removals during the period between surveys and with the current inventory.

Logging residues.—The unused growing-stock volume of trees cut for products and the total growing-stock volume of trees destroyed in the course of logging but not removed for products.

Other removals.—The growing-stock volume of trees that were removed from the inventory and not used for products, in cultural operations (weeding, thinning, etc.), land-clearing, and reclassification of some commercial forest land as noncommercial forest land.

Plant byproducts.—Wood products such as slabs, edgings, and veneer cores that are obtained incidental to the production of timber products and are utilized in the manufacture of other timber products. (Bark is not included.)

Plant residues.—Wood material produced incidental to the production of timber products but not utilized.

Roundwood products.—Logs, bolts, or other round sections cut from growing stock or nongrowing stock for industrial or nonindustrial uses.

Timber products.—Roundwood products and plant byproducts from all sources.

Timber removals.—The growing-stock volume of trees removed from the inventory for roundwood products, plus logging residues and other removals.

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Table 1.--Area by land classes, Massachusetts, 1972

Land class	Area	
	Thousand acres	Percent
Forest land:		
Commercial	2,797.7	56
Productive-reserved	104.5	2
Unproductive	50.1	1
Total forest land	2,952.3	59
Nonforest:		
Cropland a/	247.5	5
Pasture a/	53.1	1
Other	1,760.2	35
Total nonforest land	2,060.8	41
Total area c/	5,013.1	100

a/ Source: 1969 and 1964 Census of Agriculture. Total cropland includes cropland used for pasture. Pasture total based upon ratios developed from the 1964 Census report. Data extrapolated to 1972.

b/ Includes swampland, industrial and urban areas, other nonforest land, and 43,700 acres classed as water by Forest Survey standards, but defined by the Bureau of the Census as land.

c/ Source: United States Bureau of the Census, Areas of Massachusetts, 1960 (April 1967).

Table 2.--Area of commercial forest land, by ownership classes, Massachusetts, 1972

Ownership class	Area[a/]	
	Thousand acres	Percent
Other Federal	9.6	b/
State	240.1	9
County and municipal	115.7	4
Total public	365.4	13
Forest industry	30.1	1
Farmer-owned	253.6	9
Miscellaneous private:		
Individual c/	1,918.3	69
Corporate	230.3	8
Total private	2,432.3	87
All ownerships	2,797.7	100

a/ Estimates of area in each private ownership class are based upon the forest-land ownership study by the Northeastern Forest Experiment Station. Public ownerships are from ownership records.

b/ Less than 0.5 percent.

c/ Includes acreage owned by business partnerships and organizations such as churches, Boy Scouts of America, and associations.

Table 3.--Area of commercial forest land, by ownership, stand-size, and stand-volume classes, Massachusetts, 1972

(In thousands of acres)

Stand-size and stand-volume class	All ownerships	Other public	Forest industry	Farmer and other
	BY STAND-SIZE CLASSES			
Sawtimber stands	934.1	138.1	--	796.0
Poletimber stands	947.2	113.0	30.1	804.1
Sapling-seedling stands	857.5	102.5	--	755.0
Nonstocked areas	58.9	11.8	--	47.1
All classes	2,797.7	365.4	30.1	2,402.2
	BY STAND-VOLUME PER ACRE CLASSES[a]			
Less than 1,500	1,132.6	148.5	--	984.1
15,00 to 5,000	1,274.7	146.9	30.1	1,097.7
More than 5,000	390.4	70.0	--	320.4
All classes	2,797.7	365.4	30.1	2,402.2

[a] In board feet, International 1/4-inch rule.

Table 4.--Area of commercial forest land, by stocking classes based on selected stand components, Massachusetts, 1972

(In thousands of acres)

Stocking class a/ (percent)	Stocking classified in terms of--				
	All trees	Growing-stock trees			Rough and rotten trees
		Total	Desirable	Acceptable	
Overstocked:					
160	14.1	--	--	--	--
150 to 160	173.9	57.1	--	28.2	--
140 to 150	229.7	58.4	--	59.0	--
130 to 140	551.6	85.2	--	71.3	15.2
Total	969.3	200.7	--	158.5	15.2
Fully stocked:					
120 to 130	585.9	418.0	--	261.0	--
110 to 120	430.0	359.2	--	301.5	--
100 to 110	299.9	386.4	--	429.3	--
Total	1,315.8	1,163.6	--	991.8	--
Medium stocked:					
90 to 100	207.2	326.5	--	440.4	--
80 to 90	158.3	408.0	--	349.7	29.1
70 to 80	73.0	170.8	--	286.8	42.8
60 to 70	14.9	157.4	--	185.3	72.5
Total	453.4	1,062.7	--	1,262.2	144.4
Poorly stocked:					
50 to 60	14.0	131.4	--	103.8	102.2
40 to 50	--	75.3	42.4	117.4	268.2
30 to 40	--	30.3	29.1	30.3	317.0
20 to 30	30.3	30.3	70.5	30.3	527.7
10 to 20	14.9	103.4	443.3	103.4	736.1
Less than 10	--	--	2,212.4	--	686.9
Total	59.2	370.7	2,797.7	385.2	2,638.1
All classes	2,797.7	2,797.7	2,797.7	2,797.7	2,797.7

a/ Fully stocked stands are considered to contain 75 to 100 square feet of basal area per acre.

Table 5.--Area of commercial forest land, by ownership, potential site productivity, and area-condition classes, Massachusetts, 1972

(In thousands of acres)

Growth-per-acre and area-condition class	All ownerships	Other public	Forest industry	Farmer and other
		BY GROWTH-PER-ACRE CLASSES[a]		
120 to 165	172.8	34.1	--	138.7
85 to 120	587.2	80.0	--	507.2
50 to 85	862.0	115.1	--	746.9
Less than 50	1,175.7	136.2	30.1	1,009.4
All classes	2,797.7	365.4	30.1	2,402.2
		BY AREA-CONDITION CLASSES[b]		
Class 10-40	--	--	--	--
Class 50	1,135.2	182.8	30.1	922.3
Class 60	1,262.2	113.2	--	1,149.0
Class 70	400.3	69.4	--	330.9
All classes	2,797.7	365.4	30.1	2,402.2

[a] In cubic feet.

[b] Class 10-40.--Areas medium to fully stocked with desirable trees.

Class 50.--Areas poorly stocked with desirable trees but fully stocked with growing-stock trees.

Class 60.--Areas poorly stocked with desirable trees, but with medium to full stocking of growing-stock trees.

Class 70.--Areas poorly stocked with desirable trees, and poorly stocked with growing-stock trees.

Table 6.--Area of commercial forest land, by forest types, ownership classes, and stand-size classes, Massachusetts, 1972

(In thousands of acres)

Ownership and stand-size classes	White pine-red pine-hemlock	Spruce-fir	Pitch pine	Oak-pine	Oak-hickory	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	Total
BY OWNERSHIP CLASSES									
Other public	79.0	11.2	23.7	23.4	56.5	126.6	22.6	22.4	365.4
Forest industry	--	--	--	30.1	--	--	--	--	30.1
Farmer and other	553.2	17.4	50.2	164.1	545.8	668.7	353.4	49.4	2,402.2
All ownerships	632.2	28.6	73.9	217.6	602.3	795.3	376.0	71.8	2,797.7
BY STAND-SIZE CLASSES									
Sawtimber stands	389.0	28.6	29.1	71.7	155.7	115.3	144.7	--	934.1
Poletimber stands	114.8	--	--	85.9	271.3	317.1	129.6	28.5	947.2
Sapling-seedling stands	128.4	--	30.0	60.0	175.3	348.0	87.7	28.1	857.5
Nonstocked areas	--	--	14.8	--	--	14.9	14.0	15.2	58.9
All stands	632.2	28.6	73.9	217.6	602.3	795.3	376.0	71.8	2,797.7

Table 7.--Area of commercial forest land by local forest types and major forest types, Massachusetts, 1972

(In thousands of acres)

Forest type	Area	
	Local	Major
White pine-red pine-hemlock:		
Red pine	14.7	
White pine	401.4	
White pine-hemlock	144.3	
Hemlock	71.8	
Total		632.2
Spruce-Fir:		
Tamarack	14.5	
Norway spruce plantation	14.1	
Total		28.6
Pitch pine:		
Pitch pine	73.9	
Total		73.9
Oak-pine:		
White pine-N. red oak-white ash	114.6	
Eastern redcedar-hardwoods	14.1	
Other oak-pines	88.9	
Total		217.6
Oak-hickory:		
Post, black, or bear oak	127.8	
White oak-red oak-hickory	57.4	
White oak	42.8	
Northern red oak	287.7	
Mixed hardwoods	86.6	
Total		602.3
Elm-ash-red maple:		
Black ash-elm-red maple	795.3	
Total		795.3
Maple-beech-birch:		
Sugar maple-beech-yellow birch	315.1	
Black cherry	60.9	
Total		376.0
Aspen-birch:		
Aspen	57.8	
Paper birch	14.0	
Total		71.8
All forest types	2,797.7	2,797.7

Table 8.--Area of noncommercial forest land, by forest types, Massachusetts, 1972

(In thousands of acres)

Forest type	All areas	Productive-reserved areas	Unproductive areas
White pine-red pine-hemlock	37.1	22.6	14.5
Spruce-fir	3.2	3.2	--
Pitch pine	6.8	6.8	--
Oak-pine	6.7	6.7	--
Oak-hickory	20.2	16.2	4.0
Elm-ash-red maple	67.8	36.2	31.6
Maple-beech-birch	6.4	6.4	--
Aspen-birch	6.4	6.4	--
All types	154.6	104.5	50.1

Table 9.--Number of trees on commercial forest land by species groups, tree classes, and diameter classes, Massachusetts, 1972

(In thousands of trees)

Dbh class (inches)	Softwoods			Hardwoods		
	Growing-stock trees	Rough and rotten trees	Total	Growing-stock trees	Rough and rotten trees	Total
Saplings:						
1.0 to 2.9	116,214	37,475	153,689	358,577	388,675	747,252
3.0 to 4.9	60,745	18,765	79,510	220,439	100,550	320,989
Total	176,959	56,240	233,199	579,016	489,225	1,068,241
Poletimber:						
5.0 to 6.9	49,059	7,036	56,095	141,057	32,657	173,714
7.0 to 8.9	31,377	3,922	35,299	81,824	14,030	95,854
9.0 to 10.9	--	--	--	43,078	6,077	49,155
Total	80,436	10,958	91,394	265,959	52,764	318,723
Small sawtimber:						
9.0 to 10.9	21,650	2,031	23,681	--	--	--
11.0 to 12.9	13,426	1,023	14,449	20,804	3,834	24,638
13.0 to 14.9	7,142	435	7,577	9,359	1,316	10,675
Total	42,218	3,489	45,707	30,163	5,150	35,313
Large Sawtimber:						
15.0 to 16.9	3,804	387	4,191	3,999	568	4,567
17.0 to 18.9	2,471	32	2,503	1,991	764	2,755
19.0 to 20.9	976	150	1,126	924	213	1,137
21.0 to 28.9	765	145	910	921	454	1,375
29.0 and larger	49	131	180	89	40	129
Total	8,065	845	8,910	7,924	2,039	9,963
All classes	307,678	71,532	379,210	883,062	549,178	1,432,240

Table 10.--Number of growing-stock trees on commercial forest land, by species and diameter classes, Massachusetts, 1972

(In thousands of trees)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine	73,784	23,171	17,756	12,524	8,419	4,895	3,246	2,127	898	699	49
Pitch pine	10,338	4,255	2,705	1,783	969	398	166	62	--	--	--
Hemlock	32,679	16,045	7,468	4,573	3,052	902	276	219	78	66	--
Other softwoods	13,918	5,588	3,448	2,770	986	947	116	63	--	--	--
Total softwoods	130,719	49,059	31,377	21,650	13,426	7,142	3,804	2,471	976	765	49
Select white oaks	22,500	10,384	6,746	2,552	1,575	632	252	155	71	122	11
Select red oaks	42,379	12,521	12,176	8,642	4,514	1,887	1,290	708	351	230	60
Other red oaks a/	34,340	12,317	9,108	6,126	3,730	1,708	669	409	149	113	11
Hickory	6,865	2,695	1,623	1,428	494	405	78	95	25	22	--
Sugar maple	20,616	9,330	5,568	2,858	1,094	893	429	188	100	156	--
Soft maples	91,686	47,538	26,650	10,568	4,396	1,573	646	92	151	65	7
Sweet birch	11,021	5,394	3,001	1,704	508	282	79	33	--	20	--
Yellow birch	10,123	4,703	3,323	1,264	423	307	--	61	25	17	--
Paper birch	15,201	8,665	2,724	2,615	822	276	72	--	27	--	--
Beech	8,208	3,165	2,002	1,348	986	372	236	61	--	38	--
White ash	10,845	6,027	2,166	982	1,001	429	42	97	25	76	--
Black cherry	15,393	9,699	3,097	1,664	505	375	--	34	--	19	--
Aspen	7,671	4,146	2,288	570	408	107	122	30	--	--	--
Elms	2,303	1,079	677	344	68	113	--	--	--	22	--
Other hardwoods	4,895	3,394	675	413	280	--	84	28	--	21	--
Total hardwoods	304,046	141,057	81,824	43,078	20,804	9,359	3,999	1,991	924	921	89
All species	434,765	190,116	113,201	64,728	34,230	16,501	7,803	4,462	1,900	1,686	138

a/ Includes 42,000 other white oaks.

Table 11.--Net volume of timber on commercial forest land, by class of timber, softwoods and hardwoods, Massachusetts, 1972

(In millions of cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Sawtimber trees:			
Sawlog portion	1,402.0	781.7	620.3
Upper-stem portion	261.7	101.0	160.7
All sawtimber trees	1,663.7	882.7	781.0
Poletimber trees	1,729.2	384.6	1,344.6
All growing-stock trees	3,392.9	1,267.3	2,125.6
Rough trees	421.5	129.9	291.6
Rotten trees	88.4	8.6	79.8
Total, all trees	3,902.8	1,405.8	2,497.0

Table 12.--Net volume of growing stock and sawtimber on commercial forest land, by ownrship classes, stand-size classes, and forest types, softwoods and hardwoods, Massachusetts, 1972

Ownership, stand size, and forest type	Growing stock (million cubic feet)			Sawtimber (million board feet)[a]		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
BY OWNERSHIP CLASSES						
Other public	514.3	231.6	282.7	1,012.4	661.0	351.4
Forest industry	58.5	21.1	37.4	96.4	71.7	24.7
Farmer and other	2,820.1	1,014.6	1,805.5	5,483.2	2,802.5	2,680.7
All ownership	3,392.9	1,267.3	2,125.6	6,592.0	3,535.2	3,056.8
BY STAND-SIZE CLASSES						
Sawtimber stands	1,635.8	827.7	808.1	4,243.9	2,528.0	1,715.9
Poletimber stands	1,334.4	289.4	1,045.0	1,660.2	608.5	1,051.7
Sapling-seedling stands	417.6	149.1	268.5	678.7	398.7	280.0
Nonstocked areas	5.1	1.1	4.0	9.2	--	9.2
All classes	3,392.9	1,267.3	2,125.6	6,592.0	3,535.2	3,056.8
BY FOREST TYPES						
White pine-red pine-hemlock	1,064.2	768.5	295.7	2,572.9	2,171.6	401.3
Spruce-fir	49.0	42.2	6.8	110.3	98.2	12.1
Pitch pine	59.4	55.3	4.1	172.3	164.1	8.2
Oak-pine	264.2	105.3	158.9	531.8	268.0	263.8
Oak-hickory	677.3	57.4	619.9	1,091.4	161.1	930.3
Elm-ash-red maple	748.8	162.7	586.1	1,203.6	447.1	756.5
Maple-beech-birch	476.4	67.5	408.9	852.2	201.5	650.7
Aspen-birch	53.6	8.4	45.2	57.5	23.6	33.9
All types	3,392.9	1,267.3	2,125.6	6,592.0	3,535.2	3,056.8

Table 13.--Net volume of growing stock on commercial forest land, by species and diameter classes, Massachusetts, 1972

(In millions of cubic feet)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine	877.2	110.7	122.4	131.7	130.6	108.3	96.7	81.4	44.2	45.5	5.7
Pitch pine	68.1	6.4	12.8	15.7	14.1	10.6	5.7	2.8	--	--	--
Hemlock	215.9	56.3	40.6	38.5	39.4	17.3	7.7	8.2	3.7	4.2	--
Other softwoods	106.1	18.3	17.1	26.2	15.5	22.3	4.0	2.7	--	--	--
Total softwoods	1,267.3	191.7	192.9	212.1	199.6	158.5	114.1	95.1	47.9	49.7	5.7
Select white oaks	142.0	29.0	35.1	22.2	21.6	12.3	6.2	5.4	3.2	6.0	1.0
Select red oaks	404.3	42.3	72.2	82.8	69.3	40.7	36.5	26.7	15.4	13.1	5.3
Other red oaks a/	290.3	38.0	55.6	58.5	55.2	36.2	18.8	14.5	6.6	6.0	.9
Hickory	60.7	11.5	10.5	14.2	7.5	9.0	2.4	3.5	1.0	1.1	--
Sugar maple	171.3	39.4	37.1	28.4	17.1	18.6	11.8	6.4	4.2	8.3	--
Soft maples	522.2	157.0	150.7	94.4	58.8	30.4	16.6	3.1	6.2	4.1	.9
Sweet birch	66.6	17.2	17.3	15.7	6.9	5.2	2.2	1.1	--	1.0	--
Yellow birch	59.1	14.0	17.7	11.1	5.9	6.2	--	2.3	.9	1.0	--
Paper birch	84.6	25.6	14.8	24.0	11.8	5.3	2.1	--	1.0	--	--
Beech	75.8	11.0	13.1	14.9	16.3	8.3	7.4	2.5	--	2.3	--
White ash	80.3	21.1	13.9	9.8	15.1	9.0	1.2	3.6	1.3	5.3	--
Black cherry	81.5	31.5	17.7	15.5	7.2	7.4	--	1.1	--	1.1	--
Aspen	46.3	13.9	14.2	4.9	6.6	2.2	3.4	1.1	--	--	--
Elms	14.0	3.4	3.1	2.5	1.1	2.1	--	--	--	1.8	--
Other hardwoods	26.6	9.8	3.8	4.2	4.1	--	2.2	1.4	--	1.1	--
Total hardwoods	2,125.6	464.7	476.8	403.1	304.5	192.9	110.8	72.7	39.8	52.2	8.1
All species	3,392.9	656.4	669.7	615.2	504.1	351.4	224.9	167.8	87.7	101.9	13.8

a/ Includes 1,100,000 cubic feet of other white oaks.

Table 14.--Net volume of sawtimber on commercial forest land, by species and diameter classes, Massachusetts, 1972

(In millions of board feet)[a]

Species	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine	2,623.6	409.7	509.1	451.5	417.7	374.5	205.6	225.8	29.7
Pitch pine	186.2	48.7	53.8	45.0	25.6	13.1	--	--	--
Hemlock	456.4	120.2	155.8	72.5	33.1	37.7	17.3	19.8	--
Other softwoods	269.0	83.1	61.8	94.8	17.4	11.9	--	--	--
Total softwoods	3,535.2	661.7	780.5	663.8	493.8	437.2	222.9	245.6	29.7
Select white oaks	218.5	--	77.8	47.8	25.4	22.4	13.8	27.2	4.1
Select red oaks	820.2	--	249.4	158.5	149.6	113.0	65.9	59.7	24.1
Other red oaks [b]	538.9	--	198.3	141.5	77.4	60.6	29.6	27.7	3.8
Hickory	97.1	--	26.9	35.5	10.0	14.6	5.0	5.1	--
Sugar maple	265.0	--	61.1	72.3	48.7	26.9	18.6	37.4	--
Soft maples	464.6	--	210.0	118.6	69.5	13.1	29.1	19.4	4.9
Sweet birch	62.0	--	24.4	19.9	8.7	4.7	--	4.3	--
Yellow birch	63.5	--	21.1	24.2	--	9.4	4.5	4.3	--
Paper birch	75.9	--	41.9	20.5	8.7	--	4.8	--	--
Beech	143.8	--	58.8	32.5	30.9	10.7	--	10.9	--
White ash	137.6	--	54.6	35.0	4.9	14.8	5.0	23.3	--
Black cherry	63.7	--	25.5	28.9	--	4.7	--	4.6	--
Aspen	51.4	--	24.0	8.6	14.0	4.8	--	--	--
Elms	19.5	--	4.0	8.1	--	--	--	7.4	--
Other hardwoods	35.1	--	15.0	--	9.1	5.9	--	5.1	--
Total hardwoods	3,056.8	--	1,092.8	751.9	456.9	305.6	176.3	236.4	36.9
All species	6,592.0	661.7	1,873.3	1,415.7	950.7	742.8	399.2	482.0	66.6

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[a] International 1/4-inch rule

[b] Includes 4,400,000 board feet of other white oaks.

Table 15.--Net volume of sawtimber on commercial forest land, by species and quality classes, Massachusetts, 1972

(In millions of board feet)[a]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[b]
Softwoods:					
White pine	2,623.6	76.0	352.5	1,296.0	899.1
Red pine	51.3	16.1	7.6	22.4	5.2
Pitch pines	186.2	15.0	18.9	152.3	--
Other softwoods[c]	674.1	--	--	--	--
Total softwoods	3,535.2	107.1	379.0	1,470.7	904.3
Hardwoods:					
Select white oaks	218.5	14.0	29.3	131.1	44.1
Select red oaks	820.2	89.1	178.4	449.2	103.5
Other red oaks	538.9	34.4	70.4	344.8	89.3
Hickory	97.1	--	5.0	54.7	37.4
Yellow birch	63.5	3.6	9.2	27.8	22.9
Sweet birch	62.0	3.5	4.2	29.3	25.0
Paper birch	75.9	5.2	22.5	41.2	7.0
Sugar maple	265.0	10.4	28.0	171.3	55.3
Soft maples	464.6	2.9	30.8	314.0	116.9
Beech	143.8	1.4	--	126.7	15.7
White ash	137.6	15.4	37.0	65.7	19.5
Aspen	51.4	5.5	10.7	27.6	7.6
Black cherry	63.7	--	6.5	45.5	11.7
Elm	19.5	--	4.9	12.9	1.7
Other hardwoods	35.1	3.6	3.3	21.2	7.0
Total hardwoods	3,056.8	189.0	440.2	1,863.0	564.6
			(In percent)		
Hardwood quality	100	6	15	61	18

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[a] International 1/4-inch rule.

[b] Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.

[c] Species other than pine are not graded into standard-lumber grades.

Table 16.--Annual net growth, removals,[a] and mortality of growing stock and sawtimber on commercial forest land, by species, Massachusetts, 1971

Species	Growing stock			Sawtimber		
	Annual net growth	Annual timber removals	Annual mortality	Annual net growth	Annual timber removals	Annual mortality
	- - - Thousand cubic feet - - - -			- - - -Thousand board feet[b] - - - -		
Softwoods:						
White and red pines	34,051	9,329	3,057	113,256	22,789	7,931
Pitch pine	956	148	434	3,749	126	411
Hemlock	11,713	4,074	1,022	25,839	8,381	1,945
Spruce	2,132	366	549	5,114	594	594
Other softwoods	248	83	338	1,042	110	119
Total softwoods	49,100	14,000	5,400	149,000	32,000	11,000
Hardwoods:						
Select white oaks	6,203	1,443	378	11,702	2,936	163
Select red oaks	20,666	6,034	1,474	47,360	13,046	463
Other oaks	15,115	4,616	976	31,304	8,844	224
Hickory	1,303	174	--	3,743	584	--
Sugar maple	2,352	354	781	8,814	1,660	828
Soft maples	21,531	5,503	2,174	26,285	7,291	1,375
Sweet birch	2,369	390	173	3,212	854	--
Yellow birch	2,698	634	458	3,622	1,046	--
Paper birch	1,720	157	876	3,122	536	251
Beech	1,999	160	458	5,221	493	607
White ash	2,752	367	423	6,342	1,418	--
Black cherry	1,512	240	225	3,634	1,080	--
Aspen	1,691	426	705	2,930	866	--
Other hardwoods	-911	202	2,299	-1,291	346	2,089
Total hardwoods	81,000	20,700	11,400	156,000	41,000	6,000
Total, all species	130,100	34,700	16,800	305,000	73,000	17,000

[a] Data for timber removals in this table are based on the trend from 1952 through 1971.

Table 17.--Annual net growth and removals of growing stock and sawtimber on commercial forest land, by ownership classes, softwoods and hardwoods, Massachusetts, 1971

Ownership	Annual net growth			Annual timber removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
			GROWING STOCK			
			Thousand cubic feet			
Public	25,612	9,305	16,307	3,600	1,163	2,437
Forest industry	2,242	818	1,424	--	--	--
Farmer and other	102,246	38,977	63,269	31,100	12,837	18,263
All ownerships	130,100	49,100	81,000	34,700	14,000	20,700
			SAWTIMBER			
			Thousand board feet[a/]			
Public	59,255	30,092	29,163	5,240	2,921	2,319
Forest industry	4,282	3,022	1,260	--	--	--
Farmer and other	241,463	115,886	125,577	67,760	29,079	38,681
All ownerships	305,000	149,000	156,000	73,000	32,000	41,000

a/ International 1/4-inch rule.

Table 18.--Annual mortality of growing stock and sawtimber on commercial forest land, by ownership classes, causes, softwoods and hardwoods, Massachusetts, 1971

Ownership and cause	Growing stock (thousand cubic feet)			Sawtimber (thousand board feet)[a]		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
			BY OWNERSHIP CLASS			
Public	2,178	971	1,207	1,353	575	778
Forest industry	200	--	200	--	--	--
Farmer and other	14,422	4,429	9,993	15,647	10,425	5,222
All ownerships	16,800	5,400	11,400	17,000	11,000	6,000
			BY CAUSE			
Disease	12,556	3,549	9,007	10,981	6,432	4,549
Weather	1,701	1,137	564	4,972	4,338	634
Fire	381	220	161	230	230	--
Suppression	198	--	198	--	--	--
Insects	32	32	--	--	--	--
Unknown	1,932	462	1,470	817	--	817
All causes	16,800	5,400	11,400	17,000	11,000	6,000

[a] International 1/4-inch rule.

Table 19.--Components of average annual net growth of growing stock and sawtimber on commercial forest land, softwoods and hardwoods, Massachusetts, 1952-71

Components	All species	Soft-woods	Hard-woods
		GROWING STOCK Thousand cubic feet	
Growth on initial growing-stock inventory a/	60,911	22,620	38,291
Ingrowth--saplings that became poletimber	72,378	23,544	48,834
Gross growth	133,289	46,164	87,125
Cull increment	8,989	764	8,225
Annual mortality	13,900	4,500	9,400
Average annual net growth	110,400	40,900	69,500
		SAWTIMBER Thousand board feet b/	
Growth on initial sawtimber inventory a/	101,965	58,425	43,540
Ingrowth--poletimber trees that became sawtimber	173,634	71,409	102,225
Gross growth	275,599	129,834	145,765
Cull increment	12,699	1,034	11,665
Annual mortality	13,500	8,800	4,700
Average annual net growth	249,400	120,000	129,400

a/ Including growth on trees that were cut.

b/ International 1/4-inch rule.

Table 20.--Sampling errors for major forest area and timber-volume classes, Massachusetts, 1972

Table no.	Item classification	Sampling error
	FOREST AREA	
		Percent
1	Forest-land area:	
	Commercial	2.0
	Unproductive	*
	Total	2.1
2	Ownership:	
	Forest industry	**
	Farmer owned	26
	Misc. private	4
	Farmer and misc. private	4
3	Stand-size class:	
	Sawtimber stands	10
	Poletimber stands	10
	Sapling-seedling stands	10
	Nonstocked areas	47
3	Stand-volume per acre (board feet):	
	Less than 1,500	8
	1,500 to 5,000	8
	More than 5,000	17
5	Growth-per-acre class (cubic feet):	
	120 to 165	28
	85 to 120	14
	50 to 85	11
	Less than 50	9
5	Area-condition class:	
	Class 50	9
	Class 60	8
	Class 70	16

Table no.	Item classification	Sampling error	
	TIMBER VOLUME		
		Cubic feet	Board feet
		Percent	
11	Class of timber:		
	Sawtimber trees	5	--
	Poletimber trees	4	--
	All growing stock	2.5	--
	Rough trees	9	--
	Rotten trees	12	--
	All live trees	2	--
12	Ownership:		
	Other public	19	24
	Forest industry	*	*
	Farmer and other	5	7
12	Stand-size class:		
	Sawtimber stands	9	7
	Poletimber stands	11	14
	Sapling-seedling	15	20
	Nonstocked areas	*	**
12	Forest type:		
	White pine-red pine-hemlock	12	13
	Spruce-fir	*	*
	Pitch pine	*	*
	Oak-pine	28	33
	Oak-hickory	15	19
	Elm-ash-red maple	15	20
	Maple-beech-birch	19	20
	Aspen-birch	*	*

6	Forest type:		
	White pine-red pine-hemlock		12
	Spruce-fir		*
	Pitch pine		43
	Oak-pine		25
	Oak-hickory		13
	Elm-ash-red maple		12
	Maple-beech-birch		17
	Aspen-birch		44
		Cubic feet	Board feet
		Percent	
13-14	Species:		
	White pine	10	9
	Pitch pine	34	40
	Hemlock	21	23
	Other softwoods	38	47
	All softwoods	8	7
	Select white oaks	14	20
	Select red oaks	12	15
	Other oaks	16	18
	Hickory	27	39
	Sugar maple	19	24
	Soft maple	10	17
	Sweet birch	24	32
	Yellow birch	24	34
	Paper birch	19	32
	Beech	23	32
	White ash	22	34
	Black cherry	27	38
	Aspen	26	42
	Elm	33	*
	Other hardwoods	31	*
	All hardwoods	5	8
	All species	2.5	3.6
13-14	Diameter classes (inches):		
	5.0- 6.9	6	--
	7.0- 8.9	5	--
	9.0-10.9 a/	5	11
	11.0-12.9	6	7
	13.0-14.9	9	8
	15.0-16.9	9	8
	17.0-18.9	10	10
	19.0-20.9	12	12
	21.0-28.9	13	13
	29.0 and larger	33	33
17	Growth by:		
	Softwoods	11	11
	Hardwoods	8	10
	All species	6	8
17	Removals by:		
	Softwoods	32	40
	Hardwoods	24	33
	All species	20	28
	MORTALITY		
18	By species group:		
	Softwoods	24	35
	Hardwoods	16	31
	All species	14	25
18	By cause:		
	Fire	*	**
	Disease	16	32
	Insects	**	--
	Weather	45	*
	Suppression	*	--
	Unknown	28	47

* Sampling errors of 50 to 99 percent.

** Sampling error of 100 percent or more.

a/Board-foot sampling error for this class is for softwoods only.

Table 21.--Output of timber products, by source of material, softwoods and hardwoods, Massachusetts, 1971

Product and species group	Standard units	Total output		Output from roundwood		Output from plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Sawlogs:							
Softwood	M bd. ft.[a]	42,003	7,038	42,003	7,038	--	--
Hardwood	M bd. ft.[a]	31,562	5,295	31,562	5,295	--	--
Total	M bd. ft.[a]	73,565	12,333	73,565	12,333	--	--
Veneer logs and bolts:							
Softwood	M bd. ft.[a]	--	--	--	--	--	--
Hardwood	M bd. ft.[a]	232	38	232	38	--	--
Total	M bd. ft.[a]	232	38	232	38	--	--
Pulpwood:							
Softwood	Std. cords[b]	13,722	1,166	8,912	757	4,810	409
Hardwood	Std. cords[b]	10,907	927	3,351	285	7,556	642
Total	Std. cords[b]	24,629	2,093	12,263	1,042	12,366	1,051
Piling:							
Softwood	M linear ft.	--	--	--	--	--	--
Hardwood	M linear ft.	2	1	2	1	--	--
Total	M linear ft.	2	1	2	1	--	--
Poles:							
Softwood	M pieces	1	13	1	13	--	--
Hardwood	M pieces	2	1	2	1	--	--
Total	M pieces	3	14	3	14	--	--

Posts (round and split):							
Softwood	M pieces	45	29	45	29	--	--
Hardwood	M pieces	--	--	--	--	--	--
Total	M pieces	45	29	45	29	--	--
Other:							
Softwood	M cu. ft.	465	465	8	8	457	457
Hardwood	M cu. ft.	516	516	198	198	318	318
Total	M cu. ft.	981	981	206	206	775	775
Total industrial products:							
Softwood	M cu. ft.		8,711		7,845		866
Hardwood	M cu. ft.		6,778		5,818		960
Total	M cu. ft.		15,489		13,663		1,826
Fuelwood:							
Softwood	Std. cords	3,845	308	845	68	3,000	240
Hardwood	Std. cords	11,215	897	5,815	465	5,400	432
Total	Std. cords	15,060	1,205	6,660	533	8,400	672
All products:[d]							
Softwood	M cu. ft.		9,019		7,913		1,106
Hardwood	M cu. ft.		7,675		6,283		1,392
Total	M cu. ft.		16,694		14,196		2,498

a/ International 1/4-inch rule.

b/ Rough wood basis, includes chips converted to equivalent standard cords.

c/ Includes handle, roller, and dimension bolts; pickets and stakes; charcoalwood; horticultural mulch, and novelty items.

d/ Does not include 1,069 M cubic feet of softwood and 912 M cubic feet of hardwood residues used for agricultural bedding.

Table 22.--Output of roundwood products, by source, softwoods and hardwoods, Massachusetts, 1971

(In thousands of cubic feet)

Product and species group	All sources	Growing-stock trees a/			Rough and rotten trees a/	Salvable dead trees a/	Other sources b/
		Total	Sawtimber	Poletimber			
PRINCIPAL INDUSTRIAL PRODUCTS							
Sawlogs:							
Softwood	7,038	6,104	5,908	196	--	46	888
Hardwood	5,295	5,084	4,838	246	23	--	188
Total	12,333	11,188	10,746	442	23	46	1,076
Veneer logs and bolts:							
Softwood	--	--	--	--	--	--	--
Hardwood	38	37	37	--	--	--	1
Total	38	37	37	--	--	--	1
Pulpwood:							
Softwood	757	650	270	380	3	3	101
Hardwood	285	162	--	162	--	--	123
Total	1,042	812	270	542	3	3	224
MISCELLANEOUS INDUSTRIAL PRODUCTS							
Piling:							
Softwood	--	--	--	--	--	--	--
Hardwood	1	1	1	--	--	--	--
Total	1	1	1	--	--	--	--
Poles:							
Softwood	13	13	11	2	--	--	--
Hardwood	1	1	--	1	--	--	--
Total	14	14	11	3	--	--	--

Posts (round and split):							
Softwood	29	10	--	10	--	17	2
Hardwood	--	--	--	--	--	--	--
Total	29	10	--	10	--	17	2
Other:							
Softwood	8	2	--	2	--	5	1
Hardwood	198	130	85	45	34	7	27
Total	206	132	85	47	34	12	28
			TOTAL INDUSTRIAL PRODUCTS				
Softwood	7,845	6,779	6,189	590	3	71	992
Hardwood	5,818	5,415	4,961	454	57	7	339
Total	13,663	12,194	11,150	1,044	60	78	1,331
			NONINDUSTRIAL PRODUCTS				
Fuelwood:							
Softwood	68	24	--	24	--	39	5
Hardwood	465	305	199	106	80	16	64
Total	533	329	199	130	80	55	69
			ALL PRODUCTS				
Softwood	7,913	6,803	6,189	614	3	110	997
Hardwood	6,283	5,720	5,160	560	137	23	403
Total	14,196	12,523	11,349	1,174	140	133	1,400

a/ On commercial forest land.

b/ Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or any material from noncommercial forest land or nonforest land such as fence rows and suburban areas.

Table 23.--Timber removals from growing stock and sawtimber on commercial forest land, by items, softwoods and hardwoods, Massachusetts, 1971

Item	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Thousand cubic feet			Thousand board feet[a/]		
Roundwood products:						
Sawlogs	11,188	6,104	5,084	48,656	26,837	21,819
Veneer logs and bolts	37	--	37	167	--	167
Pulpwood	812	650	162	984	984	--
Piling	1	--	1	5	--	5
Poles	14	13	1	50	50	--
Posts	10	10	--	--	--	--
Other	132	2	130	382	--	382
Fuelwood	329	24	305	896	--	896
All products	12,523	6,803	5,720	51,140	27,871	23,269
Logging residues	1,753	565	1,188	1,277	638	639
Other removals	17,165	6,536	10,629	28,865	12,356	16,509
Total removals	31,441	13,904	17,537	81,282	40,865	40,417

a/ International 1/4-inch rule.

Table 24.--Volume of unused residues at sawmills,[a] by type of residue for softwoods and hardwoods, Massachusetts, 1971

(In thousands of cubic feet)

Type of residue	Softwoods	Hardwoods	All species
Coarse[b]	820.7	352.0	1,172.7
Fine [c]	93.5	67.2	160.7
Total	914.2	419.2	1,333.4

[a] The sawmill industry was the only industry in Massachusetts with unused residues.

[b] Material, such as slabs and edgings.

[c] Material, such as sawdust and shavings.

Table 25.--Area by land classes and counties, Massachusetts, 1972

County	Total land area a/	Nonforest land area	Forest-land area		
			Non-commercial b/	Commercial	Sampling error c/
	Thousand acres				Percent
Barnstable	251.6	174.4	7.2	70.0	18
Berkshire	601.9	151.5	22.2	428.2	6
Bristol	354.6	160.1	8.8	185.7	9
Dukes	66.5	66.5	--	--	--
Essex	316.1	188.1	5.7	122.3	13
Franklin	453.3	108.6	15.1	329.6	5
Hampden	397.8	138.0	26.6	233.2	6
Hampshire	338.8	101.8	10.9	226.1	5
Middlesex	528.1	294.5	9.2	224.4	10
Nantucket	29.4	29.4	--	--	--
Norfolk	252.2	125.9	15.6	110.7	11
Plymouth	418.7	182.4	9.6	226.7	8
Suffolk	35.6	35.6	--	--	--
Worcester	968.5	304.0	23.7	640.8	4
Total	5,013.1	2,060.8	154.6	2,797.7	2

a/ Source: Areas of Massachusetts: 1960, Area Measurement Report, Bureau of the Census.

b/ Includes unproductive and productive-reserved forest land.

c/ In percent for commercial forest land, at the 68 percent probability level.

Table 26.--Area of commercial forest land, by ownership classes and counties, Massachusetts, 1972

(In thousands of acres)

County	Public-owned			Private-owned		Total
	Other federal	State	County and municipal	Farmer-owned	Other private	
Barnstable	5.3	4.0	2.0	1.7	57.0	70.0
Berkshire	.1	69.1	30.9	30.1	298.0	428.2
Bristol	.2	5.0	7.5	12.2	160.8	185.7
Essex	--	8.2	1.6	10.4	102.1	122.3
Franklin	--	56.3	4.6	39.7	229.0	329.6
Hampden	--	8.8	26.0	17.2	181.2	233.2
Hampshire	--	18.5	17.8	28.1	161.7	226.1
Middlesex	3.0	8.4	5.6	13.6	193.8	224.4
Norfolk	1.0	2.8	3.0	6.5	97.4	110.7
Plymouth	--	9.5	8.0	34.3	174.9	226.7
Worcester	--	49.5	8.7	59.8	522.8	640.8
STATE	9.6	240.1	115.7	253.6	2,178.7	2,797.7

Table 27.--Area of commercial forest land, by stand-size classes and counties, Massachusetts, 1972

(In thousands of acres)

County	Sawtimber stands	Poletimber stands	Sapling-seedling stands	Nonstocked areas	Total
Barnstable	18.3	15.4	33.0	3.3	70.0
Berkshire	211.6	143.6	64.4	8.6	428.2
Bristol	56.1	59.6	65.6	4.4	185.7
Essex	25.0	39.2	55.6	2.5	122.3
Franklin	122.3	113.7	88.1	5.5	329.6
Hampden	93.0	87.5	48.8	3.9	233.2
Hampshire	90.5	79.0	52.1	4.5	226.1
Middlesex	50.8	76.6	93.1	3.9	224.4
Norfolk	22.5	37.0	48.6	2.6	110.7
Plymouth	77.9	57.2	81.8	9.8	226.7
Worcester	166.1	238.4	226.4	9.9	640.8
Total	934.1	947.2	857.5	58.9	2,797.7

Table 28.--Area of commercial forest land, by forest types and counties, Massachusetts, 1972

(In thousands of acres)

County	White pine-red pine-hemlock	Spruce fir	Pitch pine	Oak-pine	Oak-hickory	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	Total
Barnstable	20.2	0.6	4.6	6.3	11.2	19.5	6.5	1.1	70.0
Berkshire	95.4	8.5	5.5	16.7	59.8	97.1	135.0	10.2	428.2
Bristol	62.2	2.1	7.8	15.8	35.2	50.4	9.8	2.4	185.7
Essex	23.5	.3	2.8	9.5	31.6	43.6	6.0	5.0	122.3
Franklin	72.4	5.0	5.5	20.4	69.7	90.7	57.9	8.0	329.6
Hampden	42.6	2.6	2.2	17.7	51.5	60.3	51.7	4.6	233.2
Hampshire	46.0	2.9	2.7	14.4	46.4	58.2	50.5	5.0	226.1
Middlesex	43.8	.6	5.0	18.6	58.3	79.2	9.9	9.0	224.4
Norfolk	18.0	.4	2.9	9.4	29.5	40.1	5.4	5.0	110.7
Plymouth	76.3	2.6	17.3	19.4	33.9	56.0	18.1	3.1	226.7
Worcester	131.8	3.0	17.6	69.4	175.2	200.2	25.2	18.4	640.8
Total	632.2	28.6	73.9	217.6	602.3	795.3	376.0	71.8	2,797.7

Table 29.--Net volume of growing stock and sawtimber on commercial forest land, by stand-size classes and counties, Massachusetts, 1972

County	Sawtimber stands	Poletimber stands	Other stands	Total	Sampling error of total
		Million cubic feet			Percent
Barnstable	34.1	21.3	13.4	68.8	27
Berkshire	359.5	206.8	41.1	607.4	9
Bristol	104.6	84.1	34.1	222.8	17
Essex	41.8	54.3	24.8	120.9	21
Franklin	199.6	162.3	48.5	410.4	11
Hampden	160.0	123.4	27.2	310.6	12
Hampshire	152.2	111.9	28.2	292.3	12
Middlesex	89.3	105.8	42.4	237.5	15
Norfolk	39.0	51.5	21.0	111.5	19
Plymouth	156.0	83.6	35.4	275.0	15
Worcester	299.7	329.4	106.6	735.7	8
Total	1,635.8	1,334.4	422.7	3,392.9	3
		Million board feet[a]			Percent
Barnstable	94.4	24.0	20.8	139.2	44
Berkshire	886.2	277.3	86.8	1,250.3	12
Bristol	293.3	101.7	55.2	450.2	27
Essex	110.8	66.6	34.8	212.2	30
Franklin	493.0	207.0	82.4	782.4	17
Hampden	406.6	159.6	49.3	615.5	18
Hampshire	380.1	143.8	51.9	575.8	18
Middlesex	238.2	128.4	61.4	428.0	24
Norfolk	103.9	61.3	29.6	194.8	30
Plymouth	424.7	96.1	57.4	578.2	25
Worcester	812.7	394.4	158.3	1,365.4	14
Total	4,243.9	1,660.2	687.9	6,592.0	4

a/ International 1/4-inch rule.

Table 30.--Net volume of growing stock and sawtimber on commercial forest land, by forest types and counties, Massachusetts, 1972

County	White pine-red pine-hemlock	Spruce-fir	Pitch pine	Oak-pine	Oak-hickory	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	Total
				Million cubic feet					
Barnstable	31.9	1.4	2.8	3.6	9.2	14.8	4.5	0.6	68.8
Berkshire	166.8	11.9	5.7	27.2	82.9	119.5	180.9	12.5	607.4
Bristol	100.9	4.6	6.1	16.0	36.3	45.2	12.1	1.6	222.8
Essex	35.0	.6	1.9	12.0	29.9	34.1	4.5	2.9	120.9
Franklin	117.8	7.0	3.8	27.4	82.0	89.7	73.3	9.4	410.4
Hampden	76.0	4.2	2.4	24.7	64.9	65.7	68.6	4.1	310.6
Hampshire	79.1	4.1	2.5	19.2	57.0	60.2	65.4	4.8	292.3
Middlesex	70.0	1.4	4.3	24.5	58.7	64.0	10.2	4.4	237.5
Norfolk	28.9	1.0	1.7	11.9	29.6	31.0	5.0	2.4	111.5
Plymouth	135.4	5.8	14.3	13.7	32.5	50.7	21.2	1.4	275.0
Worcester	222.4	7.0	13.9	84.0	194.3	173.9	30.7	9.5	735.7
Total	1,064.2	49.0	59.4	264.2	677.3	748.8	476.4	53.6	3,392.9
				Million board feet[a/]					
Barnstable	80.6	2.6	7.2	6.6	11.6	23.7	6.2	0.7	139.2
Berkshire	368.0	31.6	17.1	78.4	164.6	219.5	357.9	13.2	1,250.3
Bristol	259.8	8.2	17.9	29.7	50.0	68.8	13.9	1.9	450.2
Essex	84.7	1.0	5.9	21.5	43.8	46.5	5.4	3.4	212.2
Franklin	267.1	18.5	11.7	55.2	138.8	143.6	136.6	10.9	782.4
Hampden	176.1	10.2	7.5	54.9	114.2	115.6	132.5	4.5	615.5
Hampshire	178.5	10.9	7.9	42.3	102.6	102.8	125.4	5.4	575.8
Middlesex	172.8	2.6	13.1	43.5	87.6	91.5	12.2	4.7	428.0
Norfolk	71.7	1.7	5.1	20.7	44.1	43.2	5.9	2.4	194.8
Plymouth	349.9	10.5	38.1	25.3	42.8	87.0	23.5	1.1	578.2
Worcester	563.7	12.5	40.8	153.7	291.3	261.4	32.7	9.3	1,365.4
Total	2,572.9	110.3	172.3	531.8	1,091.4	1,203.6	852.2	57.5	6,592.0

a/ International 1/4-inch rule.

Table 31.--Net volume of growing stock on commercial forest land, by species, tree classes, and counties, Massachusetts, 1972

(In millions of cubic feet)

Species	Barnstable	Berkshire	Bristol	Essex	Franklin	Hampden
BY SPECIES						
White pine	26.0	111.5	77.4	34.4	87.0	61.6
Pitch pine	3.1	6.4	7.9	2.6	5.4	3.3
Hemlock	2.6	69.8	10.9	3.5	35.8	24.9
Other softwoods	3.7	18.9	11.1	2.8	11.8	8.2
Total softwoods	35.4	206.6	107.3	43.3	140.0	98.0
Select white oaks	2.6	14.6	8.6	5.8	15.2	13.0
Select red oaks	5.4	43.5	22.2	19.2	47.2	37.2
Other oaks	5.2	26.4	21.0	13.3	32.1	24.2
Hickory	1.2	6.5	4.6	2.8	7.3	4.5
Sugar maple	1.4	67.7	4.2	1.4	27.5	24.8
Soft maples	10.8	87.4	32.6	23.4	62.9	45.9
Sweet birch	.8	17.2	3.1	2.1	10.2	7.0
Yellow birch	1.0	18.6	3.2	1.0	8.8	6.9
Paper birch	.9	21.6	3.4	2.8	12.6	9.6
Beech	.6	28.2	2.2	.6	11.9	11.0
White ash	1.3	24.5	3.4	1.6	11.0	9.8
Black cherry	1.0	20.6	3.2	2.1	11.2	9.4
Aspen	.7	15.1	1.9	.6	7.0	5.4
Elm	.2	2.8	.6	.4	2.2	1.1
Other hardwoods	.3	6.1	1.3	.5	3.3	2.8
Total hardwoods	33.4	400.8	115.5	77.6	270.4	212.6
All species	68.8	607.4	222.8	120.9	410.4	310.6
BY TREE CLASSES						
Sawtimber trees	34.9	315.6	113.3	53.5	197.9	155.3
Poletimber trees	33.9	291.8	109.5	67.4	212.5	155.3
All classes	68.8	607.4	222.8	120.9	410.4	310.6

Species	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Total
BY SPECIES						
White pine	57.5	69.9	31.0	114.0	206.9	877.2
Pitch pine	3.5	4.9	2.0	12.6	16.4	68.1
Hemlock	25.9	6.4	2.5	10.2	23.4	215.9
Other softwoods	7.7	5.6	3.0	13.2	20.1	106.1
Total softwoods	94.6	86.8	38.5	150.0	266.8	1,267.3
Select white oaks	10.9	12.3	6.1	9.8	43.1	142.0
Select red oaks	31.8	37.4	18.7	20.5	121.2	404.3
Other oaks	21.2	26.5	12.9	20.2	87.3	290.3
Hickory	4.5	5.5	2.5	4.9	16.4	60.7
Sugar maple	24.2	3.0	1.3	7.2	8.6	171.3
Soft maples	43.5	42.3	20.4	35.5	117.5	522.2
Sweet birch	6.9	3.9	2.0	2.8	10.6	66.6
Yellow birch	7.3	2.0	.7	3.9	5.7	59.1
Paper birch	9.7	4.9	2.4	3.5	13.2	84.6
Beech	10.4	1.5	.8	2.5	6.1	75.8
White ahs	9.2	3.3	1.4	5.0	9.8	80.3
Black cherry	8.5	4.3	2.1	3.9	15.2	81.5
Aspen	5.6	1.5	.7	2.9	4.9	46.3
Elm	1.3	.9	.4	1.0	3.1	14.0
Other hardwoods	2.7	1.4	.6	1.4	6.2	26.6
Total hardwoods	197.7	150.7	73.0	125.0	468.9	2,125.6
All species	292.3	237.5	111.5	275.0	735.7	3,392.9
BY TREE CLASSES						
Sawtimber	145.5	108.1	49.2	145.6	344.8	1,663.7
Poletimber	146.8	129.4	62.3	129.4	390.9	1,729.2
All classes	292.3	237.5	111.5	275.0	735.7	3,392.9

Table 32.--Net volume of sawtimber on commercial forest land, by species and counties, Massachusetts, 1972

(In millions of board feet)[a]

Species	Barnstable	Berkshire	Bristol	Essex	Franklin	Hampden
White pine	76.8	347.6	233.2	102.0	260.8	187.5
Pitch pine	7.3	17.7	21.2	7.5	15.7	9.7
Hemlock	5.0	148.6	20.1	7.0	75.5	54.2
Other softwoods	9.2	52.8	28.6	5.3	31.6	21.2
Total softwoods	98.3	566.7	303.1	121.8	383.6	272.6
Select white oaks	5.0	25.0	13.2	8.2	21.4	20.6
Select red oaks	11.4	112.2	45.5	32.7	94.1	80.9
Other oaks	8.1	64.4	33.4	21.9	62.5	50.0
Hickory	1.9	15.5	7.9	4.5	13.4	6.9
Sugar maple	1.5	113.9	4.5	.7	43.6	42.1
Soft maples	7.2	117.8	23.1	14.3	65.8	50.7
Sweet birch	.2	20.8	1.6	1.4	10.5	8.1
Yellow birch	1.3	20.3	4.0	1.2	8.5	7.8
Paper birch	.4	25.2	2.3	1.4	12.2	10.7
Beech	.8	61.6	2.7	.4	22.3	23.1
White ash	1.8	53.8	4.2	1.6	17.5	20.2
Black cherry	.7	16.1	2.7	1.2	9.6	6.9
Aspen	.1	22.8	.5	.2	9.1	8.5
Elm	.4	4.2	1.0	.2	3.7	1.2
Other hardwoods	.1	10.0	.5	.5	4.6	5.2
Total hardwoods	40.9	683.6	147.1	90.4	398.8	342.9
All species	139.2	1,250.3	450.2	212.2	782.4	615.5

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Species	Hampshire	Middlesex	Norfolk	Plymouth	Worcester	Total
White pine	174.5	204.4	90.9	334.9	611.0	2,623.6
Pitch pine	10.5	14.2	5.6	30.3	46.5	186.2
Hemlock	55.2	14.0	5.4	19.1	52.3	456.4
Other softwoods	20.9	11.4	6.3	34.7	47.0	269.0
Total softwoods	261.1	244.0	108.2	419.0	756.8	3,535.2
Select white oaks	16.8	17.9	8.5	17.5	64.4	218.5
Select red oaks	69.9	66.6	32.6	45.7	228.6	820.2
Other oaks	44.6	45.4	21.6	32.9	154.1	538.9
Hickory	7.6	7.9	3.3	7.7	20.5	97.1
Sugar maple	40.6	1.9	.9	7.6	7.7	265.0
Soft maples	48.8	27.0	12.3	23.1	74.5	464.6
Sweet birch	7.8	2.6	1.3	1.1	6.6	62.0
Yellow birch	8.1	2.0	.6	3.9	5.8	63.5
Paper birch	10.6	2.6	1.1	1.8	7.6	75.9
Beech	21.0	1.2	.7	3.5	6.5	143.8
White ash	17.6	3.4	1.3	7.5	8.7	137.6
Black cherry	6.8	2.9	1.3	3.7	11.8	63.7
Aspen	8.5	.3	.1	.5	.8	51.4
Elm	1.6	.9	.3	2.2	3.8	19.5
Other hardwoods	4.4	1.4	.7	.5	7.2	35.1
Total hardwoods	314.7	184.0	86.6	159.2	608.6	3,056.8
All species	575.8	428.0	194.8	578.2	1,365.4	6,592.0

a/ International 1/4-inch rule.

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1977. **Forest statistics for Massachusetts.** Northeast. For. Exp. Stn., Upper Darby, Pa.
43 p. (USDA For. Serv. Resour. Bull. NE–48)

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